

**In the Claims:**

1. – 5. (Cancelled).

6. (New) A method for detecting toxic materials in water by using a microbial fuel cell, the method comprising:

- a. preparing a microbial fuel cell comprising an anode part and a cathode part, with activated sludge containing an electrochemically active microorganism, wherein the anode is filled with activated sludge for electrochemically active microorganisms to be attached to the anode electrode and to form enriched microbial consortium generating electrochemical signal, and the cathode is filled with tap water, thereby having a certain potential difference kept;
- b. feeding the microbial fuel cell with fuel;
- c. measuring electrochemical signals between the anode part and the cathode part of the microbial fuel cell;
- d. filtering out suspension and unwanted materials in the water sample;
- e. inflowing a water sample by a sample inlet pump into the anode part of the microbial fuel cell; and
- f. determining the degree of electrochemical signal changes corresponding to the presence of toxic material from the microbial fuel cell due to the inflow of the toxic materials.

7. (New) The method of claim 6, wherein the toxic materials include  $\text{Cr}^{6+}$ , mercury (Hg), lead (Pb), and phenol.

8. (New) The method of claim 7, wherein the electrochemically active microorganisms include electrochemically active microorganisms that generate an electrical signal change in the presence of  $\text{Cr}^{6+}$ , mercury (Hg), lead (Pb), or phenol.

9. (New) A device for detecting toxic materials in water automatically by using a microbial fuel cell, comprising:

- a. a sample inlet pump for taking a water sample and transferring it to the anode part of microbial fuel cell;
- b. a microbial fuel cell comprising an anode part and a cathode part, the anode part being filled with active sludge containing an electrochemically active microorganism, and the cathode part being filled with tap water, wherein the fuel cell senses toxic materials and generates electrochemical signals;
- c. a pretreatment tank which is arranged between the sample inlet pump and the microbial fuel cell and treats the water sample;
- d. means for measuring electrochemical signals between the anode part and the cathode part of the microbial fuel cell;
- e. a Personal Computer (PC) and controlling part which control the value of the electrochemical signals and automatically determine the toxicity of the water sample in response to changes in the electrochemical signals due to the entry of the toxic materials; and
- f. a solenoid valve and a sample-gathering vessel, wherein the solenoid valve being arranged between the sample inlet pump and the microbial fuel cell, and the sample gathering vessel being connected to the solenoid valve, said solenoid valve being adapted to change the flow of water sample to the sample gathering vessel when the entry of toxic materials into the microbial fuel cell is sensed.

10. (New) The device of claim 9, wherein the toxic materials include  $\text{Cr}^{6+}$ , mercury (Hg), lead (Pb), and phenol.

11. (New) The device of claim 10, wherein the electrochemically active microorganisms include electrochemically active microorganisms that generate an electrical signal change in the presence of  $\text{Cr}^{6+}$ , mercury (Hg), lead (Pb), or phenol.